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Letter to the Editor

Dear Sir:

Formaldehyde has been shown to cause nasal cancer in rats exposed by inhalation. Neoplasia did not develop at locations distant from sites of initial contact, a finding consistent with the chemical's high reactivity and rapid detoxification. The recently published report of the Consensus Workshop on Formaldehyde, however, drew particular attention to small excesses of malignant brain tumors and leukemia among causes of death in several groups of professionals in the U.S. and U.K. who use formaldehyde to preserve human tissues (*1*). Despite deficits of these diseases in mortality studies of formaldehyde-exposed industrial workers from the same countries, the report implied that the excesses of brain cancer and leukemia in the professional groups may have been occupationally caused.

When evaluating the significance of the mortality experience of occupational groups, it is important to consider the possible effects of social class. Small disease excesses or deficits may have resulted from lifestyle characteristics of the persons under study as reflected by their social class and not from occupational exposures or "the healthy worker effect." As indicated in Table 1, in the U.S. and U.K. mortality from brain cancer and, to a lesser degree, leukemia, has consistently increased with elevation in social class. An analysis of deaths of white males ≥ 20 years of age during 1950–1981 in the state of Washington, U.S., noted proportional mortality ratios (PMRs) of 138 and 128 for brain cancer and leukemia, respectively, among professional and technical workers. These compared to PMRs of 96 and 87 in operatives, and 75 and 66 among laborers (*2*).

The dichotomy between mortality from brain cancer and leukemia in formaldehyde-exposed professionals (social class I) and workers (operatives and laborers,

Table 1. Mortality ratios of men by social class.

Population description					Social class					
Place	Race	Age	Years	Ratio[a]	High I	II	III	IV	Low V	Ref.
Brain cancer										
Mass	White	≥20	1971–73	SMOR	164	97	114	62		(*3*)
Calif.	All	20–64	1949–51	SMR	130	127	108	77	58	(*4*)
U.S.	All	20–64	1950	SMR	136	121	109	94	81	(*5*)
U.K.	All	15–64	1970–72	SMR	108	101	111, 105	100	92	(*6*)
U.K.	All	65–74	1970–72	PMR	225	137	109, 99	85	56	(*6*)
U.K.	All	20–64	1949–53	SMR	133	96	104	88	99	(*6*)
U.K.	All	≥65	1949–53	PMR	136	112	105	90	71	(*6*)
U.K.	All	35–65	1930–32	SMR	167	92	116	97	66	(*6*)
U.K.	All	20–65	1921–23	CMFR	160	160	120	80	60	(*6*)
Leukemia										
Mass.	White	≥20	1971–73	SMOR	126	97	108	89		(*3*)
Calif.	All	20–64	1949–51	SMR	104	116	101	86	104	(*4*)
U.S.	All	20–64	1950	SMR	117	100	105	89	98	(*5*)
U.K.	All	15–64	1970–72	SMR	113	100	107, 101	104	95	(*6*)
U.K.	All	65–74	1970–72	PMR	138	124	108, 98	90	77	(*6*)
U.K.	All	20–64	1949–53	SMR	123	98	104	93	89	(*6*)
U.K.	All	≥65	1949–53	PMR	202	115	101	78	74	(*6*)
U.K.	All	20–65	1930–32	SMR	152	126	97	95	86	(*6*)

[a] SMR—standardized mortality ratio; PMR—proportional mortality ratio; SMOR—standardized mortality odds ratio; CMFR—comparative mortality figure ratio.

social classes IV and V) may be ascribed at least in part to factors associated with differences in social class. One such factor might be access to and use of medical diagnostic services and surgery. This could account for a trend in cause-specific mortality with social class even in the absence of a true difference in disease incidence, owing to a greater extent of misdiagnosis or lack of diagnosis among the lower socioeconomic strata. Whatever the reasons may be, social class gradients of disease do exist and must be taken into account by occupational epidemiologists.

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